MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
Federal state autonomous educational institution
of higher education
«Far Eastern Federal University»
(FEFU)

SCHOOL OF BIOMEDICINE

«AGREED»
Head of education program
«General medicine»
_____ Khotimchenko Yu.S._____
(signature) (Full name)
«09» of July 2019

«APPROVED»
Director of the Department of Clinical Medicine
_____ Geltser B.I._____
(signature) (Full name)
«09» of July 2019

WORKING PROGRAM OF ACADEMIC DISCIPLINE (WPAD)
«Clinical pharmacology»
Education program
Specialty 31.05.01 «General medicine»
Form of study: full time

year 6, semester C
lectures 17 hours
practical classes 51 hours
laboratory works not provided
total amount of in-classroom works 68 hours
independent self-work 112 hours
including preparation to exam 36 hours
control works ()
credit not provided
exam year 6, semester C

The working program is drawn up in accordance with the requirements of the Federal state educational standard of higher education (level of training), approved by the order of the Ministry of education and science of the Russian Federation from 09.02.2016 № 95.

The working program of the discipline was discussed at the meeting of the Department of fundamental and clinical medicine. Protocol No. 8, 09 of July 2019

Authors: c.m.sc. docent Savchenko S.V., Shirogorodskaya V.V.

Resume of the working program of discipline

«Clinical Pharmacology»

The discipline " Clinical Pharmacology"is intended for students enrolled in the educational program 31.05.01" General medicine" and included into the basic part, included in the basic part of the curriculum, implemented 6th year in the B semester.

The total complexity of the discipline studying is 5 credits, 180 hours. The curriculum includes lectures (17 hours), practical classes (51 hours), independent self-work of students (112 hours).

Development of the working program of the discipline was made in accordance with the Federal state educational standard of higher education in the specialty 31.05.01 "General medicine" (the level of training specialty), curriculum of the student training.

The course program is based on the basic knowledge gained by students:

ability to abstract thinking, analysis, synthesis (GCC-1);

readiness for medical use of drugs and other substances and their combinations in solving professional problems (GPC-8);

the capacity for the assessment of morphological and physiological states and pathological processes in the human body for solving professional tasks (GPC-9);

the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of medical rehabilitation and sanatorium treatment (PC-14)

The goal of the program is to expand the art and science training of the future medical specialists in the field of clinical pharmacology. The study of the most effective and safe pharmaceuticals or their combinations for the information of doctors on the basis of knowledge of pharmacodynamics, pharmacokinetics, drug interactions, adverse drug reactions, principles of evidence-based medicine.

Objectives:

- formation of knowledge concerning the main issues of clinical pharmacology (pharmacodynamics, pharmacokinetics, pharmacogenetics, drug interactions, undesirable drug reactions, pharmacoeconomics, pharmacoepidemiology).
- formation of ideas about the sections of clinical pharmacology, regulating rational choice of drugs: evaluation of efficacy and safety, drug formulary, pharmacoeconomics, pharmacoepidemiology.

. As a result of this discipline studying, students form the following professional competencies (elements of competencies).

Code and formulation of competence	**Stages of competence formation**	
the readiness for medical use of drugs and other medical substances and their combinations in solving professional problems (GPC – 8)	Knows	Typical pathological processes in the human body and mechanisms of their development
	Able to	Explain changes in the patient's body based on knowledge of typical pathological processes.
	Masters	Skills of interpretation of disorders in the patient's body to explain the correction of existing disorders
the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of medical rehabilitation and sanatorium treatment (PC – 14)	Knows	- actual problems and tendencies of pharmacology development; - theoretical and methodological bases of pharmacology; - rules for prescribing medicines in various dosage forms
	Able to	- explain the mechanisms of the main pathological processes;

	Masters	- methodology of pharmacological and diagnostic information processing with the help of modern computer technologies;

I. THE STRUCTURE AND CONTENT OF THE THEORETICAL PART OF THE COURSE

Module 1. General questions of clinical pharmacology (4 hours)

Theme 1. Subject of clinical pharmacology. The content of terms and concepts. Sections in clinical pharmacology. Drug interactions (2 hours.)

Theme 2. Undesirable effects of drugs (side and toxic), classification, mechanism and significance in the pharmacotherapy of diseases. Emergency care of anaphylactic shock. (2 hours.)

Module 2 Clinical pharmacology of different types of pathology (14 hours)

Theme 3. Clinical pharmacology of anti-inflammatory drugs and analgesics. (2 hours.)

Theme 4. Pharmacotherapy of chronic and acute heart failure. CHD. (2 hours.)

Theme 5. Clinical pharmacology of drugs for the treatment of hypertension (part 2). (2 hours.)

Theme 6. Clinical pharmacology of drugs affecting bronchial patency. (2 hours.)

Theme 7. Pharmacotherapy of kidney disease, urinary tract, sexual disorders. (2 hours.)

Theme 8. Clinical pharmacology of psychotropic drugs. (2 hours.)

Theme 9. Basic principles of rational antibacterial therapy. (Beta-lactam antibiotics; fluoroquinolones, macrolides, tetracyclines, etc.) (2 hours.)

II. THE STRUCTURE AND CONTENT OF THE PRACTICAL PART OF THE COURSE

Practical classes (54 hours.)

Lesson 1. Subject of clinical pharmacology. The content of terms and concepts. Sections of clinical pharmacology. Drug interactions (3 hours.)

Subject and objectives of clinical pharmacology. Sections of clinical pharmacology (clinical pharmacokinetics, pharmacodynamics, pharmacogenetics, pharmacoeconomics, pharmacoepidemiology). The concept of pharmacotherapy. Types of pharmacotherapy (etiotropic, pathogenetic, symptomatic, preventive). Basic principles of rational pharmacotherapy (minimization, rationality, efficiency, controllability, individuality). Stages of pharmacotherapy.

Lesson 2. Undesirable effects of drugs (side and toxic), classification, mechanism and significance in the pharmacotherapy of diseases. Emergency care of anaphylactic shock. (3 hours.)

Adverse drug reactions. WHO classification: reactions A, B, C, D, E. Toxic effects of medicines. Adverse drug reactions due to the pharmacological effects of drugs. Allergic and pseudoallergic reactions. Carcinogenicity of drugs. Drug dependence (mental and physical). Withdrawal. Risk factors of the adverse drug reactions. Diagnostics, correction and prevention of adverse drug reactions. Alert rules of supervision of drugs on the occurrence of adverse drug reactions.

Toxic reactions of drugs. Detoxification in case of poisoning by different groups of drugs. Antidote therapy. Chemical mutagenicity. Carcinogenicity of pharmaceuticals. Drug dependence: physical, mental, drug addiction. Abstinence syndrome. Tolerance. Allergic reaction. Idiosyncrasy. hypersensitivity of immediate type, delayed type. Urgent care for patients with anaphylactic shock.

Lesson 3. Clinical pharmacology of drugs for topical and general anesthesia, muscle relaxants. (3 hours.)

Inhalation anesthetics affecting the physical and chemical properties of lipids of neuronal membranes and change the permeability of ion channels. Decreases the flow of sodium ions while maintaining the output of potassium ions and increasing the permeability of chlorine ions. Developing hyperpolarization activated cell membranes. This disrupts the function of not only postsynaptic structures, but also presynaptic formations with inhibition of release of mediators. In this regard, the main neurophysiological effect developing is an increase in the threshold of excitation of nerve cells.

The rate of development and depth of anesthesia depends on the flow of inhalation anesthetics to the brain from the blood. In turn, the saturation of the blood with anesthetics is due to their content in the respiratory mixture entering lungs. Increasing the concentration of inhalation anesthetic in the respiratory mixture accelerates the onset of anesthesia. The partial pressure of anesthetic is consistently increased in the alveoli, blood and tissues until equalization in all body environments. Inhalation anesthesia has their solubility in the blood and tissue fluid is of great importance for distribution.

Lesson 4. Clinical pharmacology of anti-inflammatory drugs and analgesics. (3 hours.)

A key element of the mechanism - inhibition of prostaglandin synthesis due to inhibition of COX activity, the main enzyme involved in the metabolism of arachidonic acid. Arachidonic acid, formed with the participation of phospholipase A2, is a source of both inflammatory mediators and a number of BAS, involved in the physiological processes of the body

Lesson 5. Clinical pharmacology of antimicrobial agents. (3 hours.)

Basic principles of antimicrobial therapy. Types of antimicrobial therapy. Objectives, means of detoxification therapy. Separate antibacterial preparations. Tools of symptomatic therapy. Features of administration. Indications for use. Side effects, methods of their prevention. Contraindications. Features for administration of uroseptics. Correction of the urine pH, diet. The algorithm of the antimicrobial

drug choice for infections of the urinary tract. First aid for anaphylactic, infectious-toxic shock, hyperthermal syndrome.

Lesson 6. Pharmacotherapy of chronic and acute heart failure. Coronary artery disease (3 hours.)

Chronic heart failure (CHF) is a syndrome that develops as a result of various diseases of the cardiovascular system and characterized by the inability of heart to provide blood circulation corresponding to the metabolic needs of the body, a decrease in the pumping function of the myocardium, chronic hyperactivation of neurohormonal systems, and manifested by shortness of breath, heartbeat, increased fatigue, restriction of physical activity and excessive fluid retention in the body.

In the case if "target" doses of ACE inhibitors cannot be achieved due to poor tolerability, there is no reason to abandon the use of ACE inhibitors at lower doses, since the differences in the effectiveness of low and high doses of ACE inhibitors are not very significant. Sudden discontinuation of therapy with ACE inhibitors can lead to decompensation of CHF, and it should not be allowed, except in cases of life-threatening complications (eg, angioedema).

ACE inhibitors are usually prescribed together with beta-blockers. It is not recommended to prescribe ACE inhibitors without diuretics in patients with signs of fluid retention (including anamnesis), as diuretics are necessary to maintain sodium balance and prevent the development of peripheral edema and stagnation in the lungs. ACE inhibitors are more preferable for long-term therapy of CHF than at II receptor blockers or a combination of direct vasodilators (e.g., hydralazine and isosorbide dinitrate).

Ischemia can be of transient character, in the case of a short-term increase in myocardial oxygen demand (angina pectoris) or local vasospasm (variant Prinzmetal angina), acquire an acute course as a result of developing coronary artery thrombosis (unstable angina, myocardial infarction) or be present constantly with severe stenosing lesions of the coronary arteries (hibernating myocardium, ischemic cardiomyopathy).

The most dangerous consequences of coronary insufficiency are arrhythmias and conduction, violations of local and global contractility of ischemic myocardium and focal necrosis of the heart muscle - myocardial infarction. These disorders can lead to sudden death (ventricular arrhythmias), the development of acute and or chronic heart failure.

Lesson 7. Clinical pharmacology of antiarrhythmic drugs. (3 hours.)

Cardiotonic effect of cardiac glycosides. Particular medicines. Features of administration. Indications and contraindications. Interaction with drugs of other groups. Signs of glycoside intoxication. First medical aid. Non-glycoside cardiotonic (drugs that increase camp levels, stimulants of glucagon receptors, β-agonists). Separate preparations. Features of administartion. Indications and contraindications. Side effects, methods of prevention. The reasons of interaction with drugs of other groups. The concept of heart rhythm disorders: mechanism, symptoms. Ways of medication correction of the heart disorders.

Lesson 8. Clinical pharmacology of drugs for treatment of hypertension (3 hours.)

Types of hypertension. The main groups of antihypertensive agents (antihypertensive agents of the central mechanism of action, α-adrenoblockers, β-adrenoblockers, ganglioblockers, myotropic antihypertensive agents, ACE inhibitors, antagonists of calcium ions, diuretics). Separate medications. Features of administration. Indications for use. Side effects, methods of their prevention. Contraindications. Interaction with drugs of other groups. Polypragmasy. First aid for hypertensive crisis.

Lesson 9. Clinical pharmacology of treatment of gastric and duodenal ulcers. (3 hours.)

The main groups of drugs (antacids, enveloping, adsorbing drugs) Individual drugs. Features of administration. Indications for use. Side effects, methods of their prevention. Contraindications. The nature of interaction with drugs of other groups. Polypragmasy. Symptoms, first aid in the perforation of gastric ulcer.

Lesson 10. Pharmacotherapy of thyroid diseases. (3 hours.)

Drugs affecting the endocrine system. The hormones of hypothalamus. Preparations of pituitary hormones and their modulators. Hormonal medications of the anterior pituitary. Hormonal medications of the middle lobe of pituitary gland. Hormonal medications of posterior pituitary. Preparations of thyroid hormones and antithyroid drugs. Drugs stimulating hormone production. Thyroid drugs (substitution therapy). Drugs inhibiting the function of the thyroid gland. Drugs from the parathyroid glands and the medicines regulating the exchange of calcium. Preparations of pancreas and the medicine used to regulate the level of glucose in the blood.

Lesson 11. Pharmacotherapy of kidney diseases, urinary tract and sexual disorders. (3 hours.)

The main causative agent of UTI is uropathogenic E. coli, detected in 65-90% of patients. Less often, the pathogens of UTI can be S. saprophyticus, P. mirabilis, Enterococcus spp., Klebsiella spp. and other members of the family Enterobacteriaceae. Complicated UTI is characterized by the presence of a wide range of pathogens, especially after long-term use of antibacterial drugs. The main causative agent of the complicated UTI remains E. coli, in addition to which the pathogens are Klebsiella pneumonia, P. mirabilis, Citrobacter spp., Enterobacter spp., Ps. aeruginosa, S. aureus and Candida fungi. In 20% of cases, associations of microorganisms are detected. Over time, it is possible to change the pathogen, the development of multi-resistant forms, which are characterized by a recurrent, more severe course.

Lesson 12. Pharmacoeconomical research methods in medicine. (3 hours.)

The results of pharmacotherapy, if possible, a comparative analysis of at least two different treatment regimens (technologies); the safety and effectiveness of new drugs; the economic costs of pharmacotherapy and diagnosis; pharmacoepidemiological statistics (pharmacoepidemiology - part of the pharmacoeconomics, which examines the safety and risk (frequency of adverse reactions) of drugs on the market, in the group of patients, then the results are

extrapolated to the total population (population); documentation of randomized clinical trials of drugs in a group of patients (population). Direct, indirect costs. Type of analysis.

1. cost-effectiveness (cost-effectiveness analysis - CEA) - assesses changes in any parameter that changes in the pathophysiological state, for example: the level of bacteriuria, blood pressure, as well as financial costs reduction;

2. cost-benefit of medical care (cost-utility - SUA) - assessment of complex biological indicators-reduction of morbidity and mortality;

3. cost-utility (cost-benefit — CBA) - assessment of quality of life changes-life extension;

4. cost minimization (cost — minimization) — assessment of financial cost reduction.

Lesson 13. Interaction of medicines. Aspects of pharmacogenetics. (3 hours.)

Clinical pharmacogenetics. Goals and objectives. Genetic factors affecting the pharmacokinetics of drugs. Genetic factors affecting the pharmacodynamics of drugs. Clinical chronopharmacology. Fundamentals of rational pharmacotherapy. Definition of "patient problem". Principles for selection of a group of essential drugs. Risk/benefit ratio. Algorithm of individual drug selection for the patient according to the criteria of efficacy, safety, acceptability and cost.

Lesson 14. Clinical pharmacology of drugs affecting vascular tone. (3 hours.)

Epinephrine (epinephrine*) - direct adrenomimetic, acting on α-and β-adrenergic receptors. In physiological concentrations, it expands the arteries of skeletal muscles, brain, slightly - the heart, which contributes to adaptation to enhanced physical and mental activity. In higher concentrations, epinephrine narrows arterioles and venules of the skin and abdominal organs, which causes a sharp, albeit short-term effect.

Lesson 15. Clinical pharmacology of drugs affecting myocardial function. (3 hours.)

Heart failure (HF) - the inability of heart to provide the amount of minute blood volume or perfusion of organs and tissues necessary for normal functioning both at rest and during physical and emotional stress, without the participation of additional compensatory mechanisms that are not activated under the same circumstances, if the functionality of the heart is within normal limits.

Drug therapy involves two main principles: unloading of cardiac activity and inotropic stimulation of the heart. Unloading the heart can be divided into four types - volume (diuretics are used), hemodynamic (vasodilators and/or long-acting dihydropyridines are used), neurohumoral (angiotensin-converting enzyme inhibitors (ACEI), antagonists of receptors to aII (ARA), aldosterone antagonists) and myocardial (beta-adrenoceptor blockers are used). In the long-term treatment of chronic heart failure, cardiac glycosides are used as positive inotropic agents.

Lesson 16. Clinical pharmacology of psychotropic drugs. (3 hours.)

Psychotropic drugs (PTS) are a large group of drugs that affect mental processes through neurotransmitter processes (release or deposition, metabolism of mediators).

The CNS has a large number of mediators: only excitatory-a-glutamic acid, only inhibitory-g-aminobutyric acid (GABA), mainly inhibitory - dopamine, histamine, other inhibitory and excitation depending on the site of action. The place of action of PTD are the deep structures of the brain (limbic system, reticular pharmacy, hypothalamus), carrying the functions of sleep and wakefulness control, emotional sphere, control of the vegetative and endocrine systems.

Lesson 17. Clinical pharmacology of corticosteroid drugs. Clinical pharmacology of drugs affecting the hemostatic system (3 hours.)

Glucocorticosteroids. Symptomatic means. Medicinal anaphylactic shock. Symptoms, diagnostics, treatment, prevention.

Clinical pharmacology of antianginal agents. Clinical pharmacology of the hypocholesterolemic funds. Clinical pharmacology of drugs affecting hemostasis.

III. TRAINING AND METHODOLOGICAL SUPPORT INDEPENDENT WORK OF STUDENTS

Educational and methodological support of independent work of students in the discipline "Clinical pharmacology" is presented in Appendix 1 and includes:

- the schedule of performing independent work in the discipline;
- characteristics of tasks for independent self-work of students and guidelines for their implementation;
- requirements for presentation and execution of the results of independent self-work;
- evaluation criteria performance of independent self-work.

IV. MONITORING THE ACHIEVEMENT OF THE COURSE OBJECTIVES

Code and formulation of competence		**Stages of competence formation**			
No.	Controlled modules / sections / topics of the discipline	Codes and stages of competence formation		Evaluation tools - name	
				intermidiate certification/exam	intermidiate certification
	Module 1. General questions of clinical pharmacology (4 hours).	the readiness for medical use of drugs and other medical substances and their combinations in solving professional problems (GPC – 8)	knows	OA-1 interview	Exam questions 4 semester - 1-38
			able to	PW-1 Test	PW-1 Test
			masters	OA-3 Report	OA-2 Colloquium

1	Module 2. Clinical pharmacology of different types of pathology (14 hours)	the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of medical rehabilitation and sanatorium treatment (PC – 14)	knows	OA-1 interview	Exam questions 4 semester - 1-38
			able to	PW-1 Test	PW-1 Test
			masters	OA-3 Report	OA-2 Colloquium
	Module 3 basics of anesthesiology, resuscitation, intensive care. Module 4. Basics of Transfusiology. Bleedings. Module 5. Basics of surgical injuries. Module 6. Basics of traumatology. Module 7. Basics of purulent surgery. Module 8. Perioperative period Module 9. Basics of Oncology	the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of medical rehabilitation and sanatorium treatment (PC – 14) the readiness for medical use of drugs and other medical substances and their combinations in solving professional problems (GPC – 8)	knows	OA-1 interview	Exam questions 4 semester - 1-38
			able to	PW-1 Test	PW-1 Test
			masters	OA-3 Report	OA-2 Colloquium
			knows	PW-1 Test	PW-1 Test
			able to	OA-3 Report	OA-2 Colloquium

Typical control tasks that determine the procedures for knowledge assessing, skills and (or) experience of activity, as well as criteria and indicators necessary for the assessment of knowledge, skills and characterizing the stages of formation of

competencies in the process of development of the educational program are presented in Appendix 2.

V. LIST OF TEXTBOOKS AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE

Main literature

(electronic and printed publications)

1. Anesthesia and Neurotoxicity / Springer Japan 2017 https://link.springer.com/book/10.1007/978-4-431-55624-4#editorsandaffiliations
2. Side Effects of Medical Cancer Therapy / Springer International Publishing AG, part of Springer Nature 2016 https://link.springer.com/book/10.1007/978-3-319-70253-7#editorsandaffiliations
3. Biological Effects of Fibrous and Particulate Substances / Springer Japan 2016 https://link.springer.com/book/10.1007/978-4-431-55732-6#editorsandaffiliations

Additional literature

(printed and electronic publications)

1. Encyclopedia of medical immunology / Springer Science+Business Media LLC 2017 https://link.springer.com/referencework/10.1007/978-1-4614-9211-5

Percutaneous Penetration Enhancers Chemical Methods in Penetration Enhancement / Springer-Verlag Berlin Heidelberg 2016 https://link.springer.com/book/10.1007/978-3-662-47862-2#editorsandaffiliations

VI. LIST OF INFORMATION TECHNOLOGIES AND SOFTWARE

The location of the computer equipment on which the software is installed, the number of jobs	List of licensed software
Multimedia auditorium Vladivostok Russian island, Ayaks 10, building 25.1, RM. M723 Area of 80.3 m2 (Room for independent work)	Windows Seven enterprice SP3x64 Operating System Microsoft Office Professional Plus 2010 office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); 7Zip 9.20 - free file archiver with a high degree of data compression; ABBYY FineReader 11 - a program for optical character recognition; Adobe Acrobat XI Pro 11.0.00 - software package for creating and viewing electronic publications in PDF; WinDjView 2.0.2 - a program for recognizing and viewing files with the same format DJV and DjVu.

In order to provide special conditions for the education of persons with disabilities all buildings are equipped with ramps, elevators, lifts, specialized places equipped with toilet rooms, information and navigation support signs.

VII. GUIDELINES FOR DEVELOPMENT OF THE DISCIPLINE

Studying course consists of in-classroom training, including a lecture course and practical training, and independent work (36 hours.). The main training time is allocated for the development of theoretical material aimed at acquiring knowledge on the rational choice of drugs.

Practical classes are held in the form of seminars with discussion of current topics, solving situational problems, performing test tasks.

In the process of training the following types of independent self-work are carried out:

- preparation for classroom training (study of educational material on lecture notes and educational literature) with the use of lectures, recommended textbooks and electronic textbooks;

- preparation of essays and reports on the proposed topics, which are listened to at the seminar or practical classes (if the topic of the report and the classes coincide)

- work with tests and questions for self-test;

- preparation for all types of control tests;

- work with educational and scientific literature.

Control self-study is carried out on the seminars, practical classes, and during the interim assessment, use of tests, test questions, case study tasks, presentations, written works, etc.

Work with educational literature is considered as a type of educational work on the module "Clinical pharmacology" and is performed within the hours allotted for its study (in the section of independent work).

The initial level of knowledge of students is determined by the entering testing, the current control of mastering the subject is determined by oral questioning during practical and seminar sessions, in solving typical case study problems and answers to test questions.

At the end of studying the module of the discipline intermediate control of knowledge with the use of test control, checking of practical skills and the solution of situational problems is carried out.

VIII. MATERIAL AND TECHNICAL MAINTENANCE OF DISCIPLINE

For practical work, as well as for the organization of independent work, students have access to the following laboratory equipment and specialized rooms that meet the current sanitary and fire regulations, as well as safety requirements during training and scientific and production works:

Name of the equipped rooms and rooms for independent work	**List of main equipment**
The computer class of the School of biomedical AUD. M723, 15 working	Screen, electrically 236*147 cm Trim Line Screen; DLP Projector, 3000 ANSI Lm, WXGA 1280x800, 2000:1 Mitsubishi EW330U; Subsystem of specialized mounting equipment CORSA-2007

places	Tuarex; Subsystem of videocommunity: matrix switch DVI Pro DXP 44 DVI Extron; DVI extender over twisted pair DVI 201 Tx/Rx the Extron; Subsystem of audiocommentary and sound; speaker system for ceiling SI 3CT LP Extron digital audio processor DMP 44 LC the Extron; the extension for the controller control IPL T CR48; wireless LAN for students is provided with a system based on access points 802.11 a/b/g / n 2x2 MIMO(2SS). Monoblock HP Loope 400 All-in-One 19.5 in (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, wifi, BT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty
Multimedia audience	Monoblock Lenovo C360G-i34164G500UDK; projection Screen Projecta Elpro Electrol, 300x173 cm; Multimedia projector, Mitsubishi FD630U, 4000 ANSI Lumen 1920 x 1080; Flush interface with automatic retracting cables TLS TAM 201 Stan; Avervision CP355AF; lavalier Microphone system UHF band Sennheiser EW 122 G3 composed of a wireless microphone and receiver; Codec of videoconferencing LifeSizeExpress 220 - Codeconly - Non-AES; Network camera Multipix MP-HD718; Two LCD panel, 47", Full HD, LG M4716CCBA; Subsystem of audiocommentary and sound reinforcement; centralized uninterrupted power supply
Reading rooms of the Scientific library of the University open access Fund (building A, level 10)	Monoblock HP Loope 400 All-in-One 19.5 in (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW,GigEth,wifi,BT,usb kbd/mse,Win7Pro (64-bit)+Win8.1Pro(64-bit),1-1-1 Wty Speed Internet access 500 Mbps. Jobs for people with disabilities equipped with displays and Braille printers.; equipped with: portable reading devices flatbed texts, scanning and reading machines videovelocity with adjustable color spectrums; increasing electronic loops and ultrasonic marker
Accreditation and simulation center of the school of Biomedicine 690922, Primorsky Krai, Vladivostok, Russian island, Saperny Peninsula, ayaks village, 10, AUD. M 508, AUD. M 510	Accreditation and simulation center: Medical couch (1 PC.) Simulator for auscultation with interactive Board (1 PC.) Mannequin for SLS and auscultation (1 PC .) Sam II (1 PC.) Blood pressure monitor (2 PCs) Simulator for auscultation (1 PC.) Portable spirometer (1 PC .) The ECG unit (1 PC.) Spirograph (1 PC.) Blood pressure monitor (2 PCs) Set with point electrodes for EEG registration in 10-20 "MCScap-26" system (1 PC.) Medical couch (2 PCs .)

Clinical base:

FEFU Medical center

Appendix 1

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
Federal state autonomous educational institution
of higher education
« Far Eastern Federal University »
(FEFU)

SCHOOL OF BIOMEDICINE

TRAINING AND METHODOLOGICAL SUPPORT OF INDEPENDENT WORK OF STUDENTS

on discipline «Clinical pharmacology»
Specialty 31.05.01 «General medicine»
Form of study: full time

Vladivostok
2016

Schedule of independent work on the discipline

No.	Date / Deadline	Type of independent work	Estimated norms of time for execution (hour)	Form of control
1	For lesson No. 1	Preparation of essays or presentations: 1.Drug disease as a manifestation of antibacterial therapy (allergic and toxic effects). 2. Medicinal disease (biological effects). 3. Comparative characteristics of different generations of antiallergic drugs.	5 hours	Speech to the audience
2	For lesson No №2	Studying on a given topic.	4 hours	Questioning
3	For lesson No №3	Studying on a given topic.	4 hours	Questioning
4	For lesson No №4	Studying on a given topic.	4 hours	Questioning
5	For lesson No №5	Studying on a given topic.	4 hours	Questioning
6	For lesson No №6	Studying on a given topic.	4 hours	Questioning
7	For lesson No №7	Studying on a given topic.	4 hours	Questioning
8	For lesson No №8	Studying on a given topic.	4 hours	Questioning
9	For lesson No №9	Studying on a given topic.	4 hours	Questioning
10	For lesson No №10	Studying on a given topic.	4 hours	Questioning
11	For lesson No №11	Studying on a given topic.	4 hours	Questioning
12	For lesson No №12	Studying on a given topic.	4 hours	Questioning
13	For lesson No №13	Studying on a given topic.	4 hours	Questioning
14	For lesson No №14	Preparation of abstracts or presentations: 1.Modern antibacterial agents for the treatment	4 hours	Speech to the audience; performing test tasks

		of nosocomial infections in pediatrics. 2. Treatment of herpetic and cytomegalovirus infection in children.		
15	For lesson No №15	Preparation of essay reports or presentations: 1. Combined antitussive drugs 2. Comparative characteristic of mucolytic drugs	4 hours	Speech to the audience; The control system and the execution of tests
16	For lesson No №16	Preparation of essay reports or presentations: 1. Pharmaceuticals used in hypotension in children. 2. Drugs used in bradyarrhythmias. 3. Potassium and magnesium medicines in the treatment of arrhythmias.	5 hours	Speech to the audience
17	For lesson No №17	Preparation of essay reports or presentations: 1. Laxatives and Antidiarrheals. 2. The use of prebiotics in Pediatrics.	5 hours	Speech to the audience
18	For lesson No №18	Preparation of essay reports or presentations: 1. Daily doses, terms of the expected effect and the most typical adverse reactions when using NSAIDs. 2. The severity of the pharmacological effects of various NSAIDs.	5 hours	Speech to the audience
		Preparation to exam	36 hours	Exam

Recommendations for independent work of students

For a successful self-study requires the use of the proposed teaching tools (textbooks, teaching-methodic manuals, e-resources, and lectures).

Different types of tasks are carried out at the lessons: self-preparation of a report or presentation or work in groups.

Approximate guidelines for writing and design of an essays

Essay is a creative activity of the student reproducing in its structure the research activities to solve theoretical and applied problems in a particular branch of scientific knowledge. That is why the course certification work is an essential component of the educational process in higher education.

The essay is a model of scientific research, independent self-work in which a student solves a problem of a theoretical or practical nature, applying the scientific principles and methods of a given branch of scientific knowledge. The result of this scientific search may have not only subjective, but also objective scientific novelty, and therefore can be presented for discussion by the scientific community in the form of a scientific report or presentation at scientific-practical conferences, as well as in a form of research article.

Essay involves the acquisition of skills for building business cooperation, based on ethical standards of scientific activity. Purposefulness, initiative, disinterested cognitive interest, responsibility for the results of their actions, conscientiousness, competence - personality traits that characterize the subject of research activities corresponding to the ideals and norms of modern science.

The essay is an independent educational and research activity of the student. The teacher assists in a consultative manner and assesses the process and the results of the activity. Teacher provides an approximate topic of the essay work, specifies the problem and topic of research with a student or intern, helps to plan and organize research activities, assigns time and a minimum number of consultations.

The teacher receives the text of the essay for verification at least ten days before the defense.

Generally there is a certain structure of the essay, the main elements of which in order of their location are the following:

1. Title page.
2. Goal.
3. Table of Contents
4. List of abbreviations, symbols and terms (if necessary).
5. Introduction.
6. Main part.
7. Conclusion.
8. Reference list.
9. Appendixes.

The title page contains educational institution, graduating department, author, teacher or supervisor, research topic, place and year of the essay.

The title of the essay should be as short as possible and fully consistent with its content.

The table of contents (content) reflects the names of the structural parts of the essay and the pages on which they are located. The table of contents should be placed at the beginning of work on one page.

The presence of a detailed introduction - a mandatory requirement for the abstract. Despite the small volume of this structural part, its preparation causes considerable difficulties. However, this is a qualitatively executed introduction that is the key to understanding the entire work, which testifies to the professionalism of the author.

Thus, the introduction is a very crucial part of the essay. The introduction should start with a justification of the relevance of the chosen topic. As applied to the essay, the concept of "relevance" has one feature. From how the author of the essay can choose a topic and how correctly he understands and evaluates this topic

from the point of view of modernity and social significance, characterizes his scientific maturity and professional preparedness.

In addition, in the introduction it is necessary to isolate the methodological basis of the essay, name the authors, whose works constituted the theoretical basis of the study. A review of the literature on the topic should show the author's thorough acquaintance with special literature, his ability to systematize sources, critically examine them, highlight the essential and determine the most important in the up-to-date state of knowledge of the topic.

The introduction reflects the importance and relevance of the chosen topic, defines the object and subject, purpose and objectives, and the chronological framework of the study.

The introduction ends with a statement of the general conclusions about the scientific and practical significance of the topic, the degree of its knowledge and sources, and the hypothesis being put forward.

The main part describes the essence of the problem, reveals the topic, determines the author's position, factual material is given as an argument and for display of further provisions. The author must demonstrate the ability to consistently present the material while analyzing it simultaneously. Preference is given to the main facts, rather than small details.

The essay ends with the final part called "conclusion". Like any conclusion, this part of the essay serves as a conclusion due to the logic of the study which is a form of synthesis accumulated in the main part of scientific information. This synthesis is a consistent, coherent presentation of the results obtained and their relation to a common goal and specific tasks set and formulated in the introduction. At this place there is a so-called "output" knowledge, which is new in relation to the original knowledge. The conclusion may include suggestions of practical matter, thereby increasing the value of theoretical materials.

So, the conclusion of the essay should contain: a) presents the conclusions of the study; b) theoretical and practical significance, novelty of the essay; c) indicated the possibility of applying the results of the study.

After conclusion it is acceptable to place the reference list of the literature used throughout. This list is one of the essential parts of the essay and reflects the independent creative work of the author of the essay.

The list of sources used is placed at the end of the work. It is made either in alphabetical order (by the name of the author or the name of the book), or in the order in which the references appear in the text of the prepared work. In all cases, the full title of the work, the names of the authors or the editor of publication are indicated if the writing team involved a group of authors, data on the number of volumes, the name of the city and publisher in which the work was published, year of publication, number of pages.

Methodical recommendations for the presentation preparation

For preparation of presentation it is recommended to use: PowerPoint, MS Word, Acrobat Reader, LaTeX-bev package. The simplest program for creation of presentations is Microsoft PowerPoint. To prepare a presentation, it is necessary to process the information collected while writing the essay.

The sequence of preparation of the presentation:

1. Clearly state the purpose of the presentation.

2. Determine what the presentation format will be: live presentation (then how long it will be) or e-mail (what will be the context of the presentation).

3. Select the entire content of the presentation and build a logical chain of presentation.

4. Identify key points in the content of the text and highlight them.

5. Determine the types of visualization (pictures) to display them on slides in accordance with the logic, purpose and specificity of the material.

6. Choose the design and format the slides (the number of pictures and text, their location, color and size).

7. Check the visual perception of the presentation.

The types of visualization include illustrations, images, charts, tables. The illustration is a representation of a real-life visual. The images - as opposed to

illustrations - are metaphor. Their purpose is to cause an emotion and create an attitude towards it, to influence the audience. With the help of well-designed and presented images, information can remain permanently in a person's memory. Chart is visualization of quantitative and qualitative relationships. They are used for convincing data demonstration, for spatial thinking in addition to the logical one. Table is a specific, visual and accurate data display. Its main purpose is to structure information, which sometimes facilitates the perception of data by the audience.

Practical hints on preparing a presentation

- printed text + slides + handouts are prepared separately;
- slides -visual presentation of information that should contain a minimum of text and maximum of images that bring a meaning, to look visually and simply;
- textual content of the presentation - oral speech or reading, which should include arguments, facts, evidence and emotions;
- recommended number of slides 17-22;
- mandatory information for the presentation: the subject, surname and initials of the speaker; message plan; brief conclusions from all that has been said; list of sources used;
- handouts should be provided with the same depth and coverage as the live performance: people trust more what they can carry with them than disappear images, words and slides are forgotten, and handouts remain a constant tangible reminder; handouts are important to distribute at the end of the presentation; Handouts should be different from slides, should be more informative.

Evaluation criteria for essays.

The stated understanding of the essay as a holistic copyright text defines the criteria for its evaluation: the novelty of the text; the validity of the source choice;

the degree of disclosure of the issue essence; compliance with the requirements for registration.

Essay novelty: a) the relevance of the research topic; b) novelty and independence in the problem formulation, formulation of a new aspect of the well-known problem in the establishment of new connections (interdisciplinary, intra-subject, integration); c) ability to work with research and critical literature, systematize and structure research material; d) the appearance of the author's position, independence of assessments and judgments; d) stylistic unity of the text, the unity of genre features.

The degree of disclosure of the question essence: a) the plan compliance with an essay; b) compliance with the content of topic and plan of an essay; c) completeness and depth of knowledge on the topic; d) the validity of the methods and techniques of work with the material; e) ability to generalize, draw conclusions, compare different points of view on one issue (problem).

The validity of the source choice: a) evaluation of the used literature: whether the most famous works on the research topic are involved (including recent journal publications, recent statistics, reports, references, etc.)

Compliance with the requirements for registration: a) How true are the references to the used literature, quotes; b) assessment of literacy and presentation culture (including spelling, punctuation, stylistic culture), knowledge of terminology; c) compliance with the requirements for the volume of essay.

The reviewer should clearly state the remarks and questions, preferably with references to the work (possible on specific pages of the work), to research and evidence that the author did not take into account.

The reviewer may also indicate: whether student has addressed the topic earlier (essays, written works, creative works, olympic works, etc.) and whether there are any preliminary results; how the graduate has conducted the work (plan, intermediate stages, consultation, revision and processing of the written or lack of a clear plan, rejection of the head recommendations).

The student submits an essay for review no later than a week before the defense. The reviewer is the teacher. Experience shows that it is advisable to acquaint the student with the review a few days before the defense. Opponents are appointed by the teacher from the students. For an oral presentation a student needs about 10–20 minutes (approximately as long as he answers with tasks for the exam).

Grade 5 is given if all the requirements for writing and defending an essay are fulfilled: the problem is indicated and its relevance is justified, a brief analysis of different points of view on the problem under consideration is made and one's own position is logically presented, conclusions are formulated, the topic is fully disclosed, the volume is met, external requirements are met design, given the correct answers to additional questions.

Grade 4 is given if the basic requirements for the essay and its defense are met, but there are some shortcomings. In particular, there are inaccuracies in the presentation of the material; or there is no logical sequence in the judgments; not sufficient volume of the essay; there are omissions in the design; additional questions for the defense are accompanied with incomplete answers.

Grade 3 is given if there are significant deviations from the requirements for referencing. In particular: the topic is covered only partially; factual errors in the content of an essay or when answering additional questions; there is no output c.

Grade 2 - the topic of an essay is not disclosed, a significant misunderstanding of the problem is found.

Grade 1 - student's essay is not presented.

Appendix 2

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
Federal state autonomous educational institution
of higher education
« Far Eastern Federal University »
(FEFU)

SCHOOL OF BIOMEDICINE

ASSESSMENT FUND
on discipline «Clinical pharmacology»
Specialty 31.05.01 «General medicine»
Form of study: full time

Vladivostok
2016

Code and the wording of competence	Stages of competence	
the readiness for medical use of drugs and other medical substances and their combinations in solving professional problems (GPC – 8)	Know	Typical pathological processes in the human body and mechanisms of their development
	Able to	To explain changes in the patient's body on the basis of knowledge of typical pathological processes.
	Own	Skills of interpretation of disorders in the patient's body to explain the correction of existing disorders
the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of medical rehabilitation and sanatorium treatment (PC – 14)	Know	actual problems and tendencies of pharmacology development; - theoretical and methodological bases of pharmacology; - rules for prescribing medicines in different dosage forms
	Able to	explain the mechanisms of the main pathological processes;
	Own	methodology of processing pharmacological, diagnostic information with the help of modern computer technologies;

MONITORING THE ACHIEVEMENT OF THE OBJECTIVES OF THE COURSE

Code and formulation of competence		Stages of competence formation			
No.	Controlled modules / sections / topics of the discipline	Codes and stages of competence formation		Evaluation tools - name	
				intermidiate certification/exam	intermidiate certification
	Module 1. General questions of clinical pharmacology (4 hours).	the readiness for medical use of drugs and other medical substances and	knows	OA-1 interview	Exam questions 4 semester - 1-38

		their combinations in solving professional problems (GPC – 8)			
			able to	PW-1 Test	PW-1 Test
			masters	OA-3 Report	OA-2 Colloquium
1	Module 2. Clinical pharmacology of different types of pathology (14 hours)	the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of medical rehabilitation and sanatorium treatment (PC – 14)	knows	OA-1 interview	Exam questions 4 semester - 1-38
			able to	PW-1 Test	PW-1 Test
			masters	OA-3 Report	OA-2 Colloquium
	Module 3 basics of anesthesiology, resuscitation, intensive care. Module 4. Basics of Transfusiology. Bleedings. Module 5. Basics of surgical injuries. Module 6. Basics of traumatology. Module 7. Basics of purulent surgery. Module 8. Perioperative period Module 9. Basics of Oncology	the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of medical rehabilitation and sanatorium treatment (PC – 14) the readiness for medical use of drugs and other medical substances and their	knows	OA-1 interview	Exam questions 4 semester - 1-38
			able to	PW-1 Test	PW-1 Test
			masters	OA-3 Report	OA-2 Colloquium
			knows	PW-1 Test	PW-1 Test
			able to	OA-3 Report	OA-2 Colloquium

		combinations in solving professional problems (GPC – 8)			

Scale of assessment of the level of competence formation

Code and formulation of competence	stages of formation of competence		criteria	indicators	points
- the readiness for medical use of drugs and other medical substances and their combinations in solving professional problems (GPC – 8)	knows (threshold level)	Typical pathological processes in the human body and mechanisms of their development	Knowledge of typical pathological processes in the human body and the mechanisms of their development	Formed and structured knowledge of typical pathological processes in the human body and the mechanisms of their development	65-71
	able (advanced)	To explain changes in the patient's body on the basis of knowledge of typical pathological processes.	Ability to explain changes in the patient's body on the basis of knowledge of typical pathological processes	Can consistently and logically explain the changes in the patient's body on the basis of knowledge of typical pathological processes	71-84
	Owns (high)	Skills of interpretation of disorders in the patient's body to explain the correction of existing disorders	Skill of interpretation of disorders in the patient's body to explain the correction of existing disorders	Capable of interpreting disorders in the patient's body to explain the correction of existing disorders	85-100
the readiness for determining the need to use natural healing factors, the drug, non-drug therapy and other methods of treatment in patients who are in need of	knows (threshold level)	- actual problems and tendencies of pharmacology development; - theoretical and methodological bases of pharmacology; - rules for prescribing medicines in different dosage forms	Knowledge of actual problems and tendencies of pharmacology development; - theoretical and methodological foundations of pharmacology; - rules of prescribing medicines in different dosage forms	Formed and structured knowledge of actual problems and tendencies of pharmacology development; - theoretical and methodological foundations of pharmacology; - rules of prescribing	65-71

medical rehabilitation and sanatorium treatment (PC – 14)				medicines in different dosage forms	
	able (advanced)	- explain the mechanisms of the main pathological processes;	Ability to explain the mechanisms of the main pathological processes;	Can consistently and logically explain the mechanisms of the main pathological processes;	71-84
	Owns (high)	- methodology of processing pharmacological, diagnostic information with the help of modern computer technologies;	Skill of processing pharmacological, diagnostic information with the help of modern computer technologies;	It is able to process pharmacologic al and diagnostic information with the help of modern computer technologies using algorithms;	85-100

Evaluation tools for interim certification

1. Subject and objectives of clinical pharmacology. Sections of clinical pharmacology (clinical pharmacokinetics, pharmacodynamics, pharmacogenetics, pharmacoeconomics, pharmacoepidemiology).
2. The concept of pharmacotherapy. Types of pharmacotherapy (etiotropic, pathogenetic, symptomatic, preventive). Basic principles of rational pharmacotherapy (minimization, rationality, efficiency, controllability, individuality). Stages of pharmacotherapy.
3. Adverse drug reactions. WHO classification: a, B, C, D, E. Toxic drug reactions.
4. Allergic and pseudoallergic drug reactions. principles of medical care for patients. Relief of anaphylactic shock. Measures to prevent allergic reactions.
5. Risk factors of adverse drug reactions. diagnostics, correction and prevention of adverse drug reactions. Rules of notification of the federal

bodies of supervision over medicines about emergence of undesirable medicinal reactions.

6. Interaction of medicines. Types of interaction. Pharmaceutical interaction.
7. The concept of drug interaction. Pharmacokinetic interaction (at the stages of absorption, distribution, metabolism, excretion).
8. The concept of drug interaction. Pharmacodynamic interaction of drugs (direct and indirect). Synergy and antagonism.
9. Interaction of medicines with food, alcohol, components of tobacco smoke, phytomedicines. Risk factors for drug interaction.
10. Features of pharmacokinetics and pharmacodynamics of drugs in pregnant women and fetus. Categories of medicines according to the degree of risk to the fetus by WHO: A, B, C, D, E, X.
11. Principles of pharmacotherapy in pregnant women. Critical period. Teratogenicity, embryotoxicity and fetotoxicity of drugs. Features of pharmacokinetics and pharmacodynamics in lactating women.
12. Features of pharmacokinetics and pharmacodynamics of drugs in children. Calculation of the children doses. Features of pharmacotherapy in children.
13. Features of pharmacokinetics and pharmacodynamics of drugs in the elderly. Calculation of the dose for elder persons. Features of pharmacotherapy in elderly and senile patients.
14. Clinical pharmacoeconomics. Criteria for pharmacoeconomic studies. Evaluation of the cost of treatment with medicines (cost estimation). The types of pharmacoeconomic analysis.
15. Clinical trials of drugs: phases of clinical trials, concept of GCP, ethical and legal norms of clinical trials, participants of clinical trials, protocols.
16. Evidence-based medicine: principles, level, evidence, end points of clinical trials. Meta-analysis. The importance of evidence-based medicine in clinical practice.
17. Mechanisms of action of medicines. Antagonists, agonists, partial agonists. Molecules-target drugs.

18. The types of pharmacological response: the expected pharmacological response, hyper-reactivity, tachyphylaxis, idiosyncrasy.
19. Evaluation of efficacy and safety of medicines. Therapeutic drug monitoring (indications, clinical significance, interpretation of results).
20. Clinical pharmacokinetics. The main pharmacokinetic parameters and their clinical significance. Pharmacokinetic curve.
21. Calculation of the load and maintenance dose of the drug.
22. Calculation of the drug dose in patients with chronic renal failure. Dose adjustment in patients with impaired liver function.
23. Ways of pharmacological correction of myocardial ischemia. Clinical pharmacology of antianginal agents: the main groups of antianginal agents, individual drugs.
24. Clinical pharmacology of organic nitrates and nitrites. Features of administration. Indications, contraindications to use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
25. Antianginal agents: indications, contraindications for use; side effects, methods of their prevention;
26. The algorithm of the first aid in angina attack.
27. Clinical pharmacology of hypocholesterolemic agents: features of pharmacokinetics, pharmacodynamics. Assignment rules. Indications. Contraindications.
28. Clinical pharmacology of drugs affecting hemostasis: features of pharmacokinetics, pharmacodynamics. Assignment rules. Indications. Contraindications.
29. Pharmacokinetic and pharmacodynamic characteristics of antihypertensive drugs.
30. The main groups of antihypertensive agents: individual drugs; indications, contraindications, side effects, methods of their prevention.
31. Clinical pharmacology of antihypertensive drugs with central mechanism of action. Features of administration. Indications, contraindications for use;

side effects, methods of their prevention; the nature of interaction with drugs of other groups.

32. Clinical pharmacology of α-blockers. Features of administration. Indications, contraindications to use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
33. Clinical pharmacology of β-blockers. Features of administration. Indications, contraindications to use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
34. Clinical pharmacology of ganglioblockers. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
35. Clinical pharmacology of myotropic hypotensive agents. Features of administration. Indications, contraindications tfor use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
36. Clinical pharmacology of calcium ion antagonists. Features of administration. Indications, contraindications to use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
37. Clinical pharmacology of diuretics. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
38. Pharmacotherapy of hypertensive crisis.
39. Pharmacokinetic and pharmacodynamic features of cardiotonic agents.
40. Clinical pharmacology of cardiotonics: individual drugs from the group of cardiac glycosides; indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
41. Clinical pharmacology of cardiotonics: individual drugs from the group of non-glycoside cardiotonic drugs; indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.

42. The concept of heart rhythm disorders. Ways of medical correction.
43. Clinical pharmacology of antiarrhythmics: individual drugs, indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
44. Pharmacokinetic and pharmacodynamic features of bronchodilators.
45. The main groups of drugs used for the treatment of bronchial obstruction: individual drugs, indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
46. Principles of pharmacotherapy of bronchial asthma, asthmatic status: drugs, rules of administration, order of administration.
47. Clinical pharmacology stabilizers of cell membranes, α,β-agonists, β-agonists. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
48. Clinical pharmacology of M-cholinoblockers. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
49. Clinical pharmacology of methylxanthines. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
50. Clinical pharmacology of systemic glucocorticosteroids. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
51. Clinical pharmacology of inhaled glucocorticosteroids. Features of administration, inhalation rules. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
52. Clinical pharmacology of H1-histamine receptor blockers. Features of administration, inhalation rules. Indications, contraindications for use; side

effects, methods of their prevention; the nature of interaction with drugs of other groups.

53. Pharmacokinetic and pharmacodynamic features of drugs used in diseases of the digestive system.
54. The main groups of drugs for the treatment of gastroduodenal pathology, individual drugs, indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
55. Principles of pharmacotherapy of gastritis. Features of the use of drugs.
56. Principles of pharmacotherapy of gastric ulcer, especially the use of drugs.
57. Pharmacological assistance in the perforation of gastric ulcer, duodenal ulcer.
58. Clinical pharmacology of H2-histamine receptor blockers. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
59. Clinical pharmacology of proton pump inhibitors. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
60. Clinical pharmacology of M-cholinoblockers. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
61. Clinical pharmacology of gastroprotection, anti-acid, enveloping, adsorbing drugs. Features of administration. Indications, contraindications for use; side effects, methods of their prevention; the nature of interaction with drugs of other groups.
62. Basic principles of antimicrobial therapy. Clinical pharmacology of antimicrobial agents.
63. Rational antibacterial therapy. Principles of rational antibacterial therapy. Rules for taking antibacterial drugs.
64. The main mechanisms of formation of resistance to antibiotic therapy. Ways to prevent resistance.

65. The concept of the minimum inhibitory concentration of the antibiotic, the average therapeutic and toxic concentration. Their importance in clinical practice.
66. Types of antimicrobial therapy. The concept of etiotropic therapy. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
67. Features of uroseptics administration. Correction of the urine pH, diet.
68. The algorithm for the choice of antimicrobial drug for the urinary tract infections.
69. Pharmacokinetic and pharmacodynamic features of antimicrobial drugs.
70. Characteristics of the main groups of antimicrobial drugs, individual drugs. Indications for use of the main groups of drugs.
71. Clinical pharmacology of the group of natural penicillins. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
72. Clinical pharmacology of the semisynthetic penicillin group. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
73. Clinical pharmacology of cephalosporin group. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
74. Clinical pharmacology of the tetracycline group. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
75. Clinical pharmacology of the macrolide group. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
76. Clinical pharmacology of fluoroquinolone group. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.

77. Clinical pharmacology of the group of carbapenems. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
78. Clinical pharmacology of monobactam group. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
79. Clinical pharmacology of the group of lincosamides. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
80. Clinical pharmacology of aminoglycoside group. Especially antibiotics. Indications for use. Side effects, methods of their prevention. Contraindications.
81. Clinical pharmacology of antiviral drugs. Clinical pharmacology.